

WHAT IS CLAIMED IS:

1. A method of simulating movement of a plurality of elements through space, the method comprising the steps of:
  - 5 generating a plurality of 2D grids, each 2D grid having a plurality of grid points;  
associating movement information with each 2D grid point;  
changing the movement information associated with the 2D grid points over a time period that includes a series of time steps;
  - 10 defining a region of 3D space using the 2D grids; and  
advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D grids.
2. A method of advecting elements through space, the
  - 15 method comprising the steps of:  
generating a plurality of 2D grids, each 2D grid having a plurality of grid points, each grid point having movement information;  
defining a region of 3D space using the 2D grids;  
generating a plurality of elements in the region of 3D space, each  
20 element having a location; and  
for each element, determining movement information for an element based on the location of the element in the region of 3D space, the determining step including:  
identifying points on the 2D grids that lie on both sides of  
25 the element at the location in the region of 3D space;  
determining movement information at the points on the 2D grids; and

interpolating between the movement information at the points on the 2D grids to determine element movement information for the element at the location in 3D space.

5           3.     The method of claim 2 wherein the movement information includes a 2D vector.

          4.     An apparatus for simulating movement of a plurality of elements through space, the apparatus comprising:  
10           means for generating a plurality of 2D grids, each 2D grid having a plurality of grid points;  
              means for associating movement information with each 2D grid point;  
              means for changing the movement information associated with  
15   the 2D grid points of the 2D grids over a time period that includes a series of time steps;  
              means for defining a region of 3D space using the 2D grids; and  
              means for advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D  
20   grids.